

Medium

Deputy Executive Engineer (Electrician)

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Sports Authority of Gujarat / Assistant Engineer (Electrical)

Consider the following statements regarding linear resistive networks: 1. Superposition theorem is applicable only if the network contains independent sources.

A

1 and 2 only

Correct

B

2 only

C

2 and 3 only

D

1, 2 and 3

Correct Answer: A

Full Detailed Explanation

Correct Answer: A - 1 and 2 only Quick Concept Explanation If a circuit response x depends linearly on independent sources $u_1, u_2, \dots$, then $x(u_1 + u_2 + \dots) = x(u_1) + x(u_2) + \dots$.

Controlled/dependent sources stay in the circuit because their value is tied to another circuit variable; turning them off changes the network itself and destroys the correct controlling relationship. Exam focus: When applying superposition, write independent OFF, dependent ON before starting the circuit reduction. Common trap: A very common error is to short/open a dependent source or to add individual source powers. Statement-wise Verification Statement 1 - Correct. Superposition theorem is applicable only if the network contains independent sources. In the intended theorem context: superposition resolves the effect of multiple independent excitations in a linear network. A dependent source is controlled by a circuit variable and is not treated as an independent excitation case. Statement 2 - Correct. Superposition cannot be applied to power calculations directly. Voltages and currents are linear response quantities, but power contains a square/product term such as V^2/R , $I^2 R$ or VI , so powers from separate source cases cannot simply be added. Statement 3 - Incorrect. Dependent sources must be deactivated while applying superposition. Dependent sources must remain active while independent voltage